

Claims

We claim:

- 1 1. A composite part having an integrated flow channel, comprising:
 - 2 an elongated foam core;
 - 3 a flow channel media attached to said elongated foam core and extending
 - 4 along a first elongated side thereof, said flow channel media defining interstices for
 - 5 the passage of resin;
 - 6 at least one fabric layer secured to said elongated foam core, and enclosing
 - 7 said first elongated side of said foam core, including said flow channel media, to
 - 8 define a resin flow path along said first elongated side.
- 1 2. The composite part according to claim 1 wherein said fabric layer further
2 encloses at least a second and third elongated side of said foam core, each of said
3 second and third elongated sides adjoining said first elongated side.
- 1 3. The composite part according to claim 1 further comprising fabric tab
2 portions extending from said second and third elongated sides.
- 1 4. The composite part according to claim 1 further comprising a second flow
2 channel media attached to said elongated foam core and extending along a second
- 3 elongated side thereof, said flow channel media defining interstices for the passage
- 4 of resin. |
- 1 5. The composite part according to claim 4 wherein said fabric layer encloses
2 said second elongated side of said foam core, including said flow channel media, to
- 3 define a second resin flow path along said second elongated side.

1 6. The composite part according to claim 5 wherein said second elongated side
2 is opposed from said first elongated side.

1 7. The composite part according to claim 1 wherein said flow channel media is
2 bounded by a second fabric layer interposed between said foam core and said flow
3 channel media.

1 8. The composite part according to claim 1 wherein said second fabric layer is a
2 substantially closed fabric for preventing a passage through said second fabric of
3 said foam core into said flow channel media.

1 9. The composite part according to claim 1 wherein said flow channel medium
2 is a three-dimensional plastic matrix.

1 10. The composite part according to claim 9 where said flow channel medium is
2 between about 50 to 90% open space.

1 11. A method of making a composite part with an integrated flow channel, said
2 method comprising the steps of:

3 arranging a fabric layer in a configuration constrained against outward
4 movement and defining a cavity between opposing surfaces thereof;

5 arranging a flow channel media adjacent at least one of said opposing
6 surfaces;

7 dispensing a predetermined amount of a self-expanding, self-curable, uncured
8 structural foam into said cavity, said foam expanding and curing in said cavity at a

9 molding pressure determined by said predetermined amount of said foam and
10 thereby attaching itself to said fabric layer and said flow channel media to form said
11 composite structure;

12 freeing said cured composite structure from said constraint of said arranging
13 step.

1 12. A method as in claim 11 wherein said fabric layer is made from one of the
2 group consisting of glass fiber, carbon fiber, aramid fiber, linear polyethylene or
3 polypropylene fiber, and polyethylene fiber.

1 13. A method as in claim 11 wherein said fabric layer is comprised of organic or
2 inorganic fibers.

1 14. A method as in claim 11 wherein said fabric layer is comprised of polyester
2 staple mat, glass fiber mat, organic fiber mat and inorganic fiber mat.

1 15. A method as in claim 11 wherein said structural foam is a two-part, self-
2 expanding, self-curing urethane foam, and a molding pressure of said foam is
3 controlled so that said foam penetrates at least partially into interstices of said
4 fabric as it expands and cures.

1 16. A method as in claim 11 further comprising the step of covering at least a
2 portion of said flow media with a second fabric layer prior to adding said foam to
3 said cavity, said second layer of fabric substantially preventing said foam from
4 penetrating into said flow media.

1 17. A method as in claim 11 wherein said flow channel media is a three
2 dimensional plastic matrix

1 18. A method as in claim 17 wherein said flow channel media comprises
2 between about 50% to 95% open space.